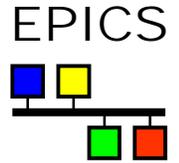# *Transient Recorder Support*
# *EPICS Meeting at ICALEPCS01*

December 2001

Marty Kraimer

Transient Recorder Support

◆ APS/ASD needs high speed TRs. Perhaps many.

◆ We already have

- ◆ Joerger VTR1012, 12 bit, 4 channel 10 megaSample/sec, 512K.
- ◆ Joerger VTR10010, 10 bit 1 channel 100 megaSample/sec, 256K.

◆ We have ordered

- ◆ Joerger VTR10012_8, 8 channel, 100 megaSample, 1K. NOTE: VTR10012 has 256K and many more features.
- ◆ Struck SIS3300, 8 channel, 100 megaSample, 128K.

◆ Initial Goal

- ◆ Be able to test all four recorders.

Generic Transient Recorder

EPICS
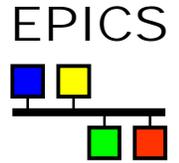
◆ GTR – Generic Transient Recorder

- ◆ A GTR is a collection of one or more high speed ADCs all of which are controlled together, share a common gate, trigger,etc.

- ◆ Provides a generic set of records for control and display.

- ◆ A generic adl file.

- ◆ Generic device support.

- ◆ A generic driver interface for device support or other code.
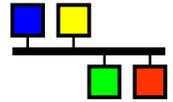
- ◆ Support for specific TRs.

Some useful features
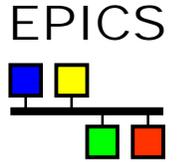
◆ After data is collected

   ◆ Recorder disarmed.

   ◆ Waveforms read.

   ◆ Optionally rearm recorder.

◆ Types of data

   ◆ postTrigger

      ◆ Data collected after trigger.

      ◆ Single or multiple triggers.

   ◆ prePostTrigger

      ◆ When armed recorder collects in circular buffer.

      ◆ After trigger collect for specified number of samples.

postTrigger
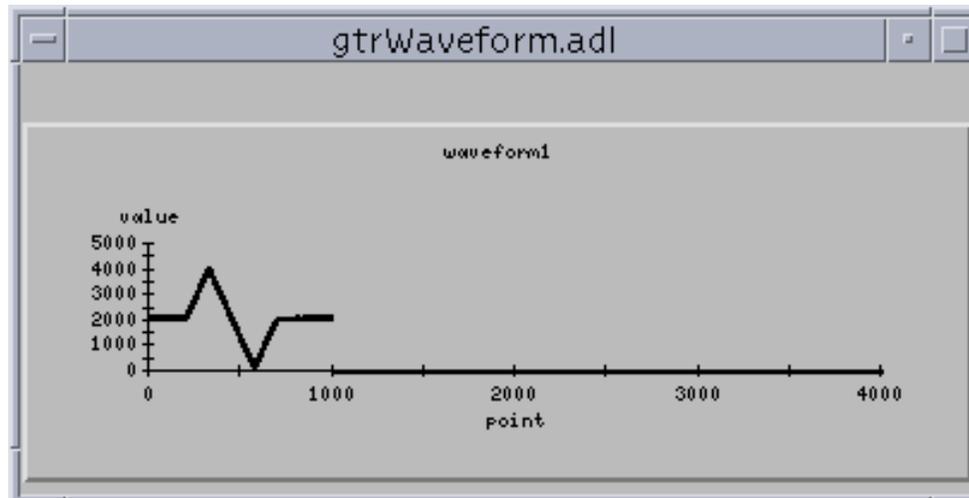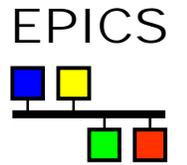
postTrigger 4 samples
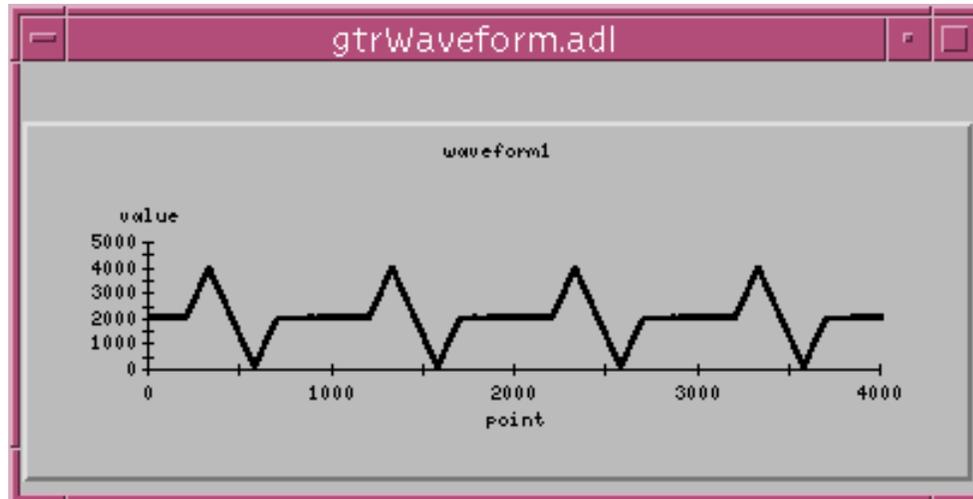
prePostTrigger FAILED!!
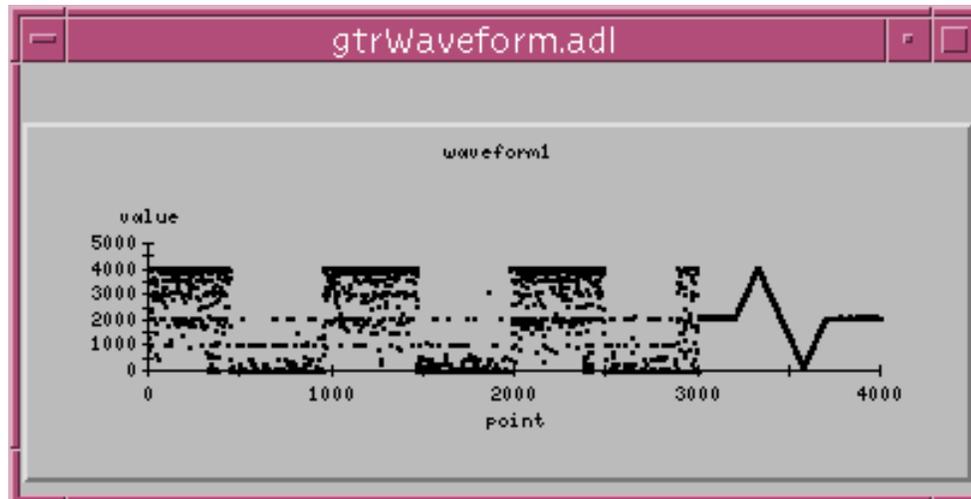
GTR Experience

◆ GTR implemented for VTR1012 and VTR10010

　◆ Implements most or all features.

　◆ Did not get VTR1012 to prePost. Don't know why.
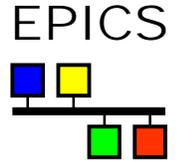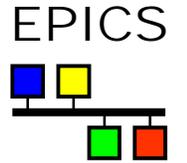
　◆ Seemed like good start.

◆ Wrote code for VTR10012 and VTR10012_8

　◆ Many features of VTR10012 not supported.

　◆ No results since we have not received it.

　◆ GTR idea still looks good.

◆ Started writing code for SIS3300

　◆ Many features not supported.

　◆ Controls don't match the registers.

　◆ GTR not used. Still generic records, adl file.
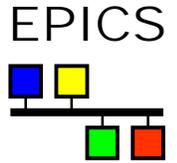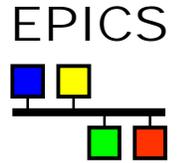
SIS3300 and GTR Control Screen

GTR vs. SIS3300

◆ GTR created without enough experience.

◆ Not sure it is a good idea
  - ◆ SIS3300 control screen is intuitive IF you read SIS documentation.
  - ◆ Essentially all features of SIS3300 are supported.

◆ Perhaps try again after more experience.
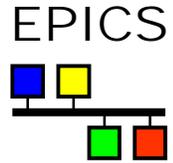
◆ May develop VTR10012 specific support.

Performance

◆ Testing showed that limit was 1 megaSample/sec.
Same limit with 68040 and with powerPC.
Limit was VME transfers from recorder memory.

◆ Why? This is only 2 megaBytes/sec
With a VME bus analyzer we determined that

  ◆ VTR1012 responded in 190 nanoseconds.

  ◆ Rest of the overhead was VME interfaces.

Maximum Throughput

◆ Guess at why 1 megaSample/sec limit (2 megaBytes/sec)

  ◆ VME max rate is 40 megaBytes/sec.

  ◆ No Block Transfer => 20 megaByte limit.

  ◆ 16 rather than 32 bit transfers => 10 megaByte limit.

  ◆ VME bus interfaces cause additional factor of 5 performance hit.

◆ Solution if needed

  ◆ VTR10012 and SIS3300 allow 32 bit transfers and Block Transfer.

  ◆ Perhaps DMA can provide 3 to 5 performance gain

    ◆ If implemented should try for generic DMA interface.

  ◆ At this point other limits may happen. For sure on mv167.

◆ Limit with VME32 will still be 20 megaSample/sec.